

Name: Solutions

1. Solve $y^2 - 6y - 16 = 0$

$$(y - 8)(y + 2) = 0$$

$$y - 8 = 0 \quad y + 2 = 0$$

$$y = 8 \quad y = -2$$

$$\{8, -2\}$$

2. Solve $4x^2 - 25 = 0$

$$(2x - 5)(2x + 5) = 0$$

$$2x - 5 = 0 \quad 2x + 5 = 0$$

$$2x = 5 \quad 2x = -5$$

$$x = \frac{5}{2} \quad x = -\frac{5}{2}$$

$$\left\{\frac{5}{2}, -\frac{5}{2}\right\}$$

3. Solve $n^2 - 14n + 49 = 0$

$$(n - 7)(n - 7) = 0$$

$$(n - 7)^2 = 0$$

$$n - 7 = 0$$

$$n = 7$$

$$\{7\}; 7 \text{ is a double root}$$

4. Solve $5m^2 + 29m - 6 = 0$

$$(5m - 1)(m + 6) = 0$$

$$5m - 1 = 0 \quad m + 6 = 0$$

$$5m = 1 \quad m = -6$$

$$m = \frac{1}{5}$$

$$\left\{\frac{1}{5}, -6\right\}$$

5. Solve $2m^3 - 162m = 0$

$$2m(m^2 - 81) = 0$$

$$2m(m-9)(m+9) = 0$$

$$2m = 0 \quad m - 9 = 0 \quad m + 9 = 0$$

$$m = 0 \quad m = 9 \quad m = -9$$

$$\{0, 9, -9\}$$

6. Solve $3x^3 + 21x^2 - 54x = 0$

$$3x(x^2 + 7x - 18) = 0$$

$$3x(x+9)(x-2) = 0$$

$$3x = 0 \quad x + 9 = 0 \quad x - 2 = 0$$

$$x = 0 \quad x = -9 \quad x = 2$$

$$\{0, -9, 2\}$$

7. Solve $y^4 - 20y^2 + 64 = 0$

$$(y^2 - 4)(y^2 - 16) = 0$$

$$(y-2)(y+2)(y-4)(y+4) = 0$$

$$y-2=0 \quad y+2=0 \quad y-4=0 \quad y+4=0$$

$$y=2 \quad y=-2 \quad y=4 \quad y=-4$$

$$\{2, -2, 4, -4\}$$

8. Solve $x^3 + 3x^2 - 9x - 27 = 0$

$$x^2(x+3) - 9(x+3) = 0$$

$$(x+3)(x^2 - 9) = 0$$

$$(x+3)(x-3)(x+3) = 0$$

$$x+3=0 \quad x-3=0 \quad x+3=0$$

$$x=-3 \quad x=3 \quad x=-3$$

$$\{-3, 3\}; -3 \text{ is a double root}$$

9. A polynomial function of degree 2 has the solution set $\{-8, 5\}$. Determine an equation of the function in **standard form**.

$$\begin{aligned}x &= -8 & x &= 5 \\x + 8 &= 0 & x - 5 &= 0 \\x &= -8 & x &= 5 \\& \{-8, 5\}\end{aligned}$$

10. A polynomial function of degree 3 has the solution set $\{2, -3\}$ with -3 as a double root. Determine an equation of the function in **standard form**.

$$\begin{aligned}x &= 2 & x &= -3 & x &= -3 \\x - 2 &= 0 & x + 3 &= 0 & x + 3 &= 0 \\(x - 2)(x + 3)(x + 3) &= 0 \\(x - 2)(x^2 + 6x + 9) &= 0 \\x^3 + 4x^2 - 3x - 18 &= 0\end{aligned}$$

11. A polynomial function of degree 3 has the solution set $\left\{0, -5, \frac{2}{3}\right\}$. Determine an equation of the function in **standard form**.

$$\begin{aligned}x &= 0 & x &= -5 & x &= \frac{2}{3} \\x + 5 &= 0 & x - \frac{2}{3} &= 0 \\& & 3x - 2 &= 0 \\x(x + 5)(3x - 2) &= 0 \\x(3x^2 + 13x - 10) &= 0 \\3x^3 + 13x^2 - 10x &= 0\end{aligned}$$